

FIG. 1

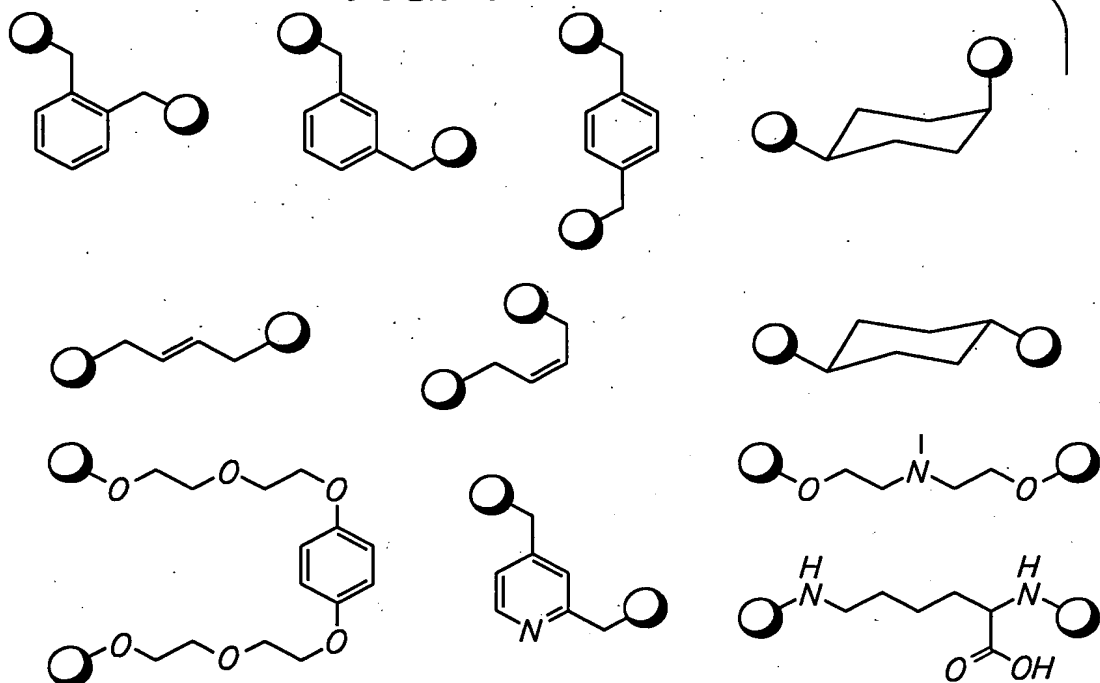


FIG. 2

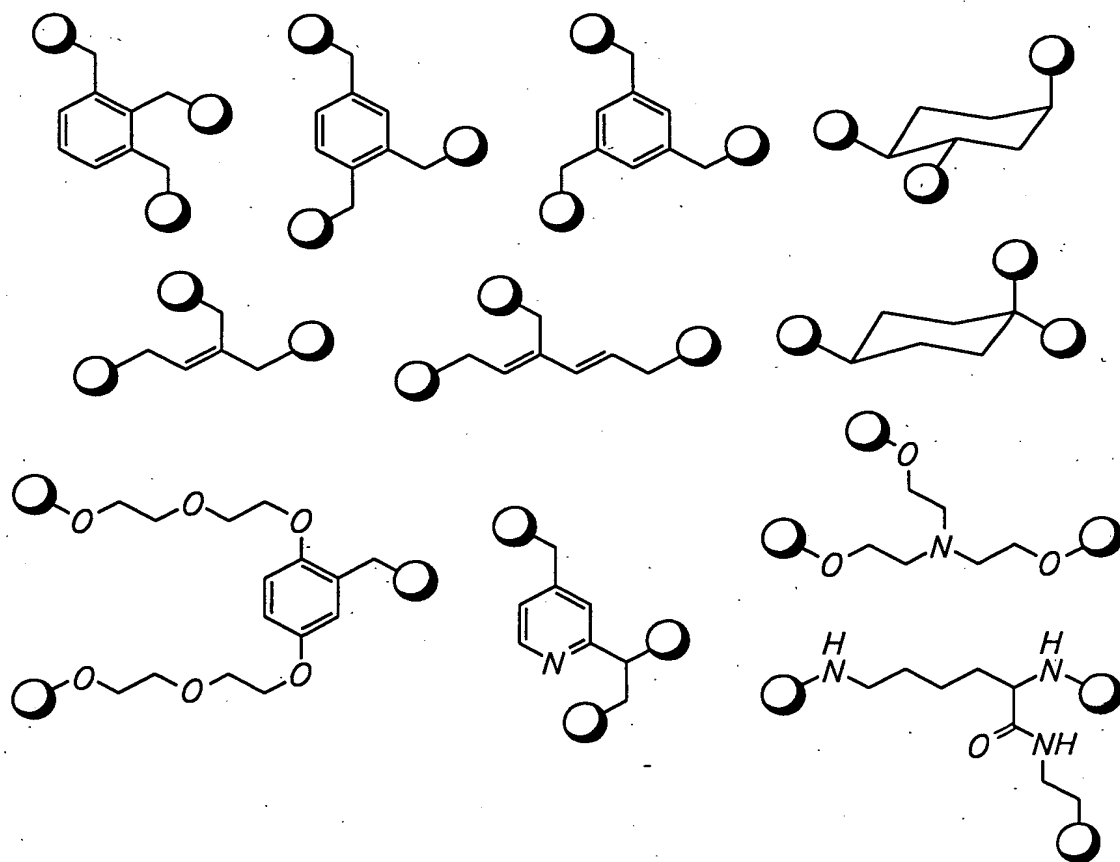


FIG. 3

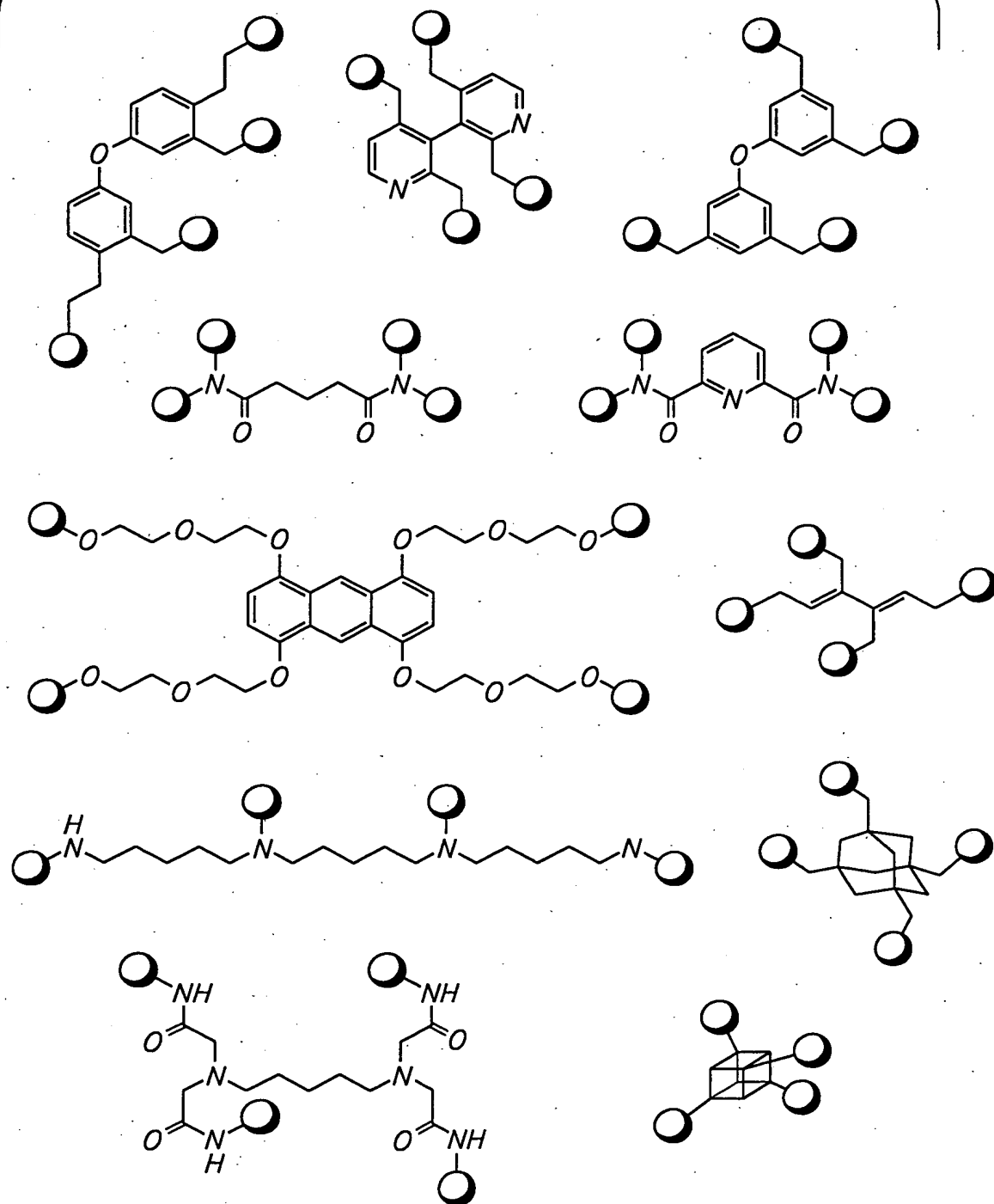
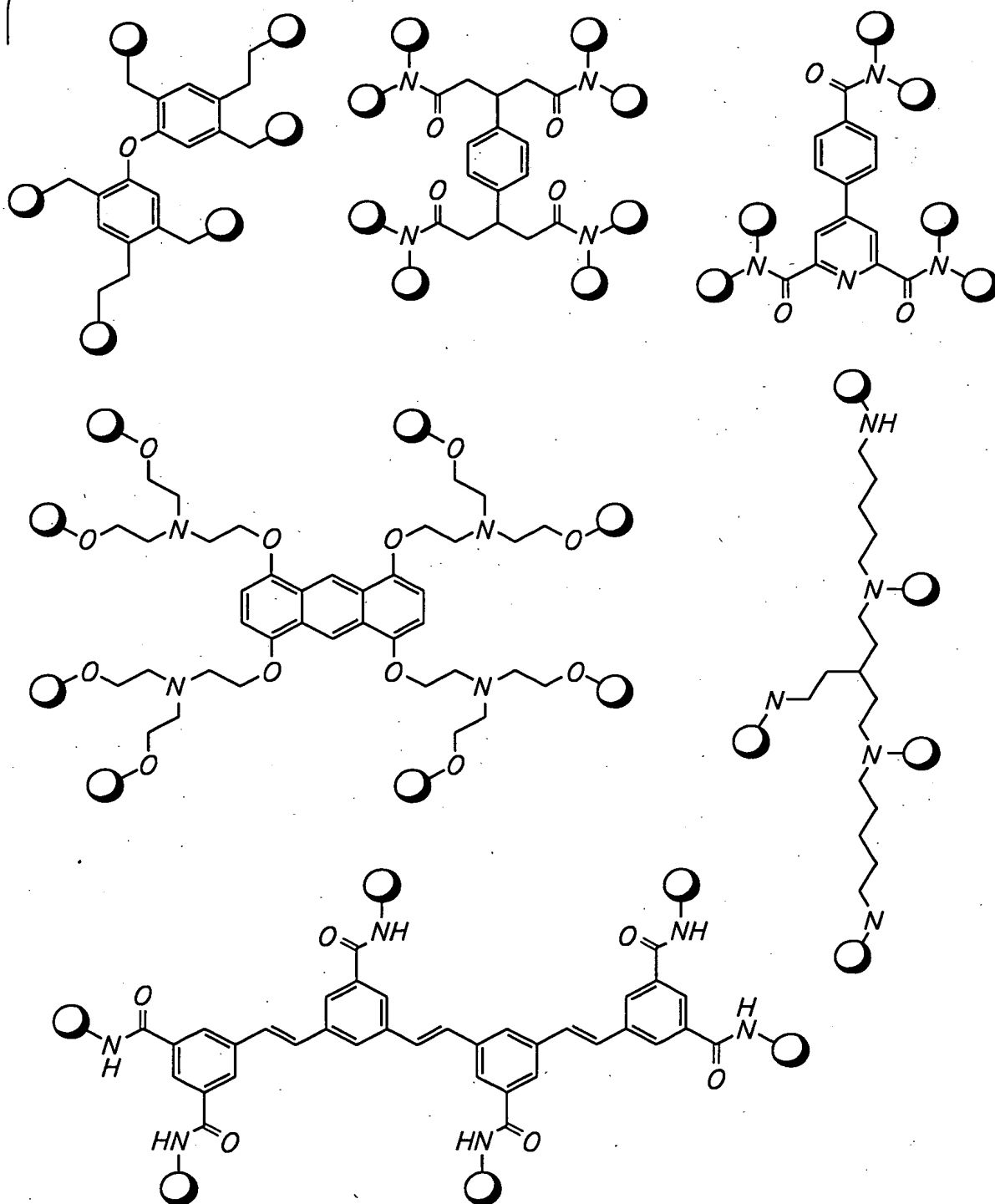


FIG. 4



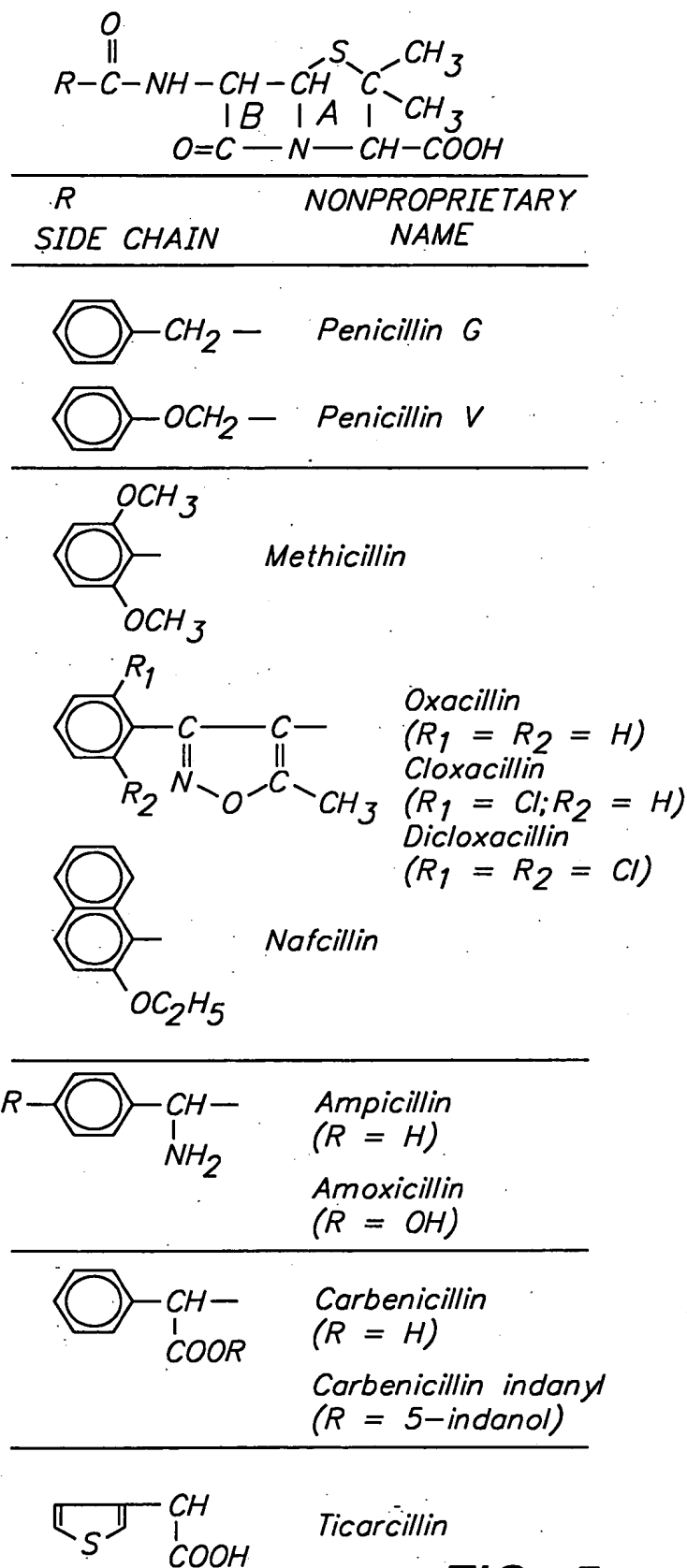


FIG. 5

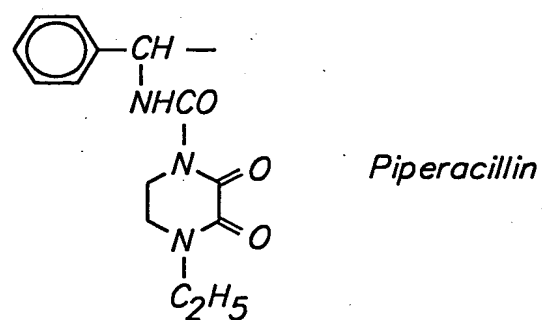
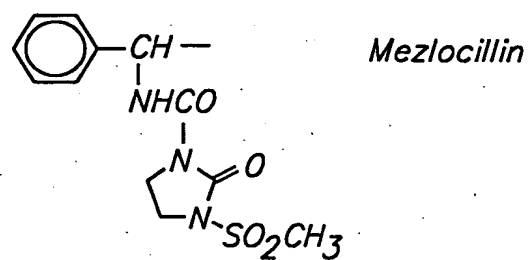
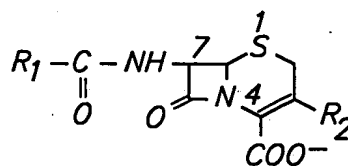


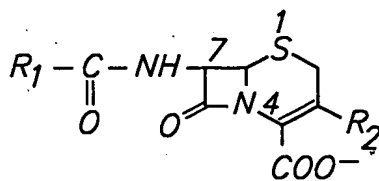
FIGURE 5 CONT'D

FIG. 6A



Cephem nucleus

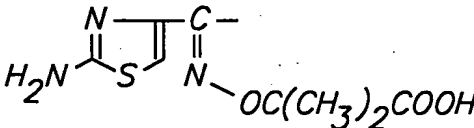
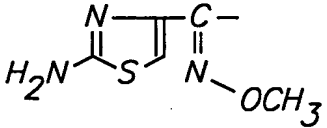
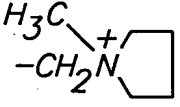
COMPOUND (TRADE NAMES)	R ₁	R ₂
First-Generation		
Cephalothin (KEFLIN)		
Cefazolin (ANCEF, KEFZOL, others)		
Cephalexin (KEFLET, KEFLEX)		
Cefadroxil (DURICEF, ULTRACEF)		
Second-Generation		
Cefamandole (MANDOL)		
Cefoxitin + (MEFOXIN)		
Cefaclor (CECLOR)		
Cefuroxime (KEFUROX, ZINACEF) Cefuroxime axetil $\frac{1}{2}$ (CEFTIN)		
Loracarbef ++ (CEFZIL)		
Cefonicid (MONOCID)		
Cefotetan (CEFOTAN)		



Cephem nucleus

COMPOUND (TRADE NAMES)	R ₁	R ₂
<i>Second-Generation CONTINUED</i>		
Ceforanide (PRECEF)		
<i>Third-Generation</i>		
Cefotaxime (CLAFORAN)		
Cefpodoxime proxetil** (VANTIN)		
Ceftizoxime (CEFTZOX)		
Ceftriaxone (ROCEPHIN)		
Cefoperazone (CEFOBID)		

FIG. 6B-1

COMPOUND (TRADE NAMES)	R_1	R_2
<i>Third-Generation (continued)</i>		
Ceftazidime (FORTAZ, others)		$-\text{CH}_2\text{N}^+\text{C}_6\text{H}_5$
<i>Fourth-Generation</i>		
Cefepime		

- + Cefoxitin, a cephamycin, has a $-\text{OCH}_3$ group at position 7 of cephem nucleus.
- + Cefuroxime axetil is the acetyloxyethyl ester of cefuroxime.
- ++ Loracarbef, a carbacephem, has a carbon instead of sulfur at position 1 of cephem nucleus.
- ** Cefpodoxime proxetil has a $-\text{COOCH}(\text{CH}_3)\text{OCOCH}(\text{CH}_3)_2$ group at position 4 of cephem nucleus.

FIG.6B-2

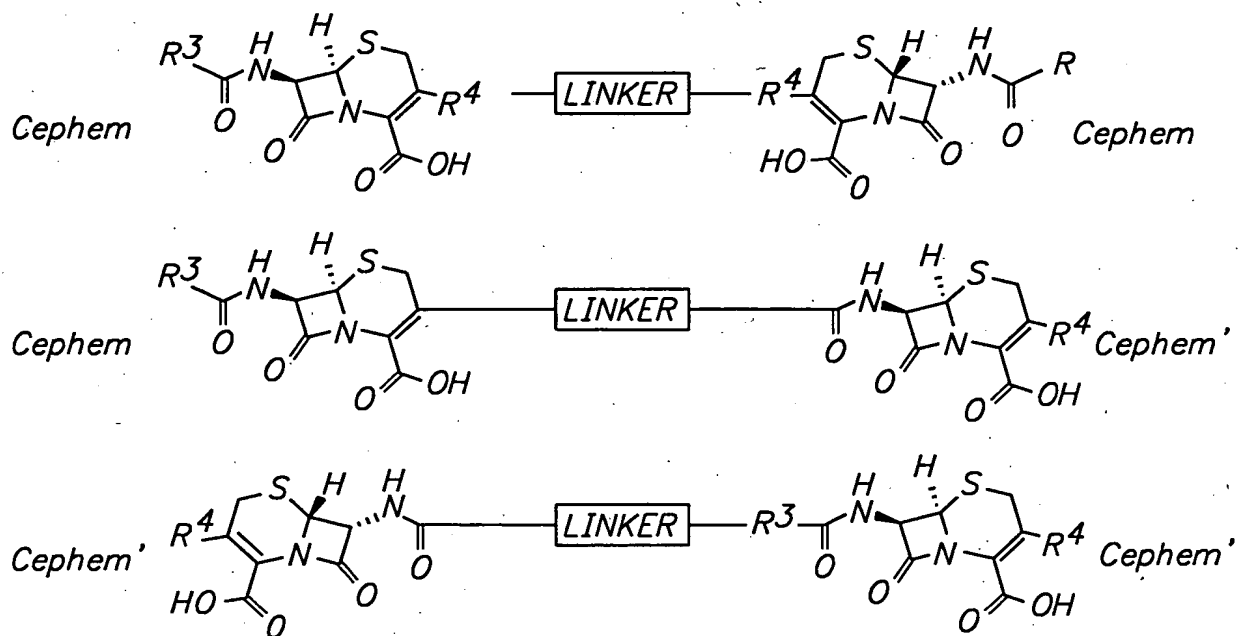


FIG. 7A

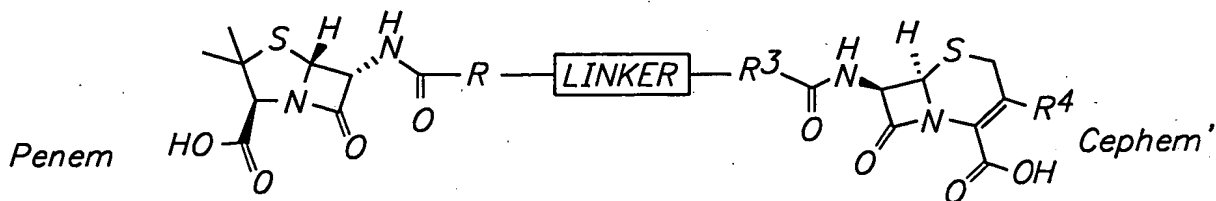
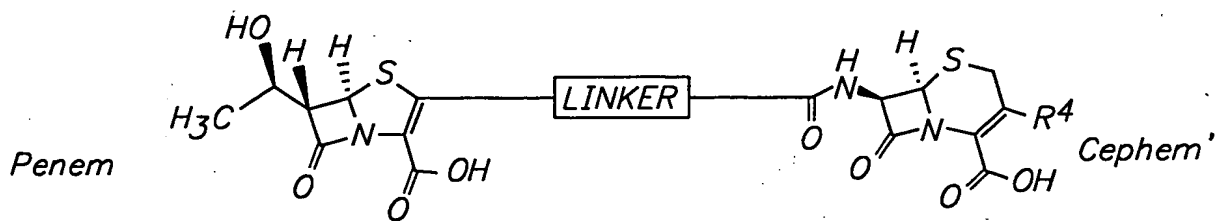
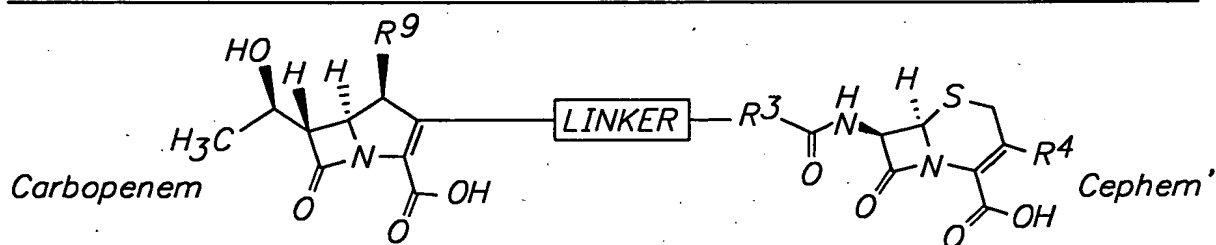
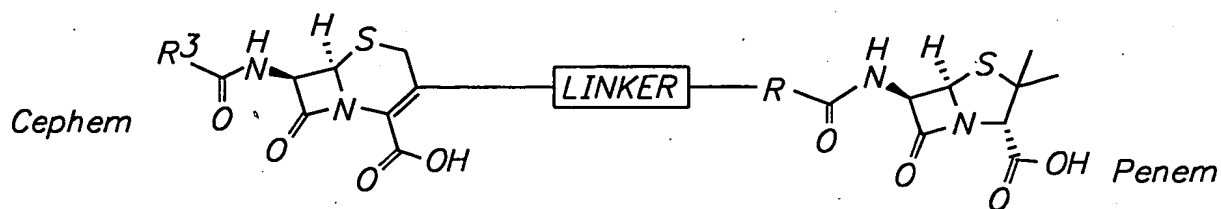
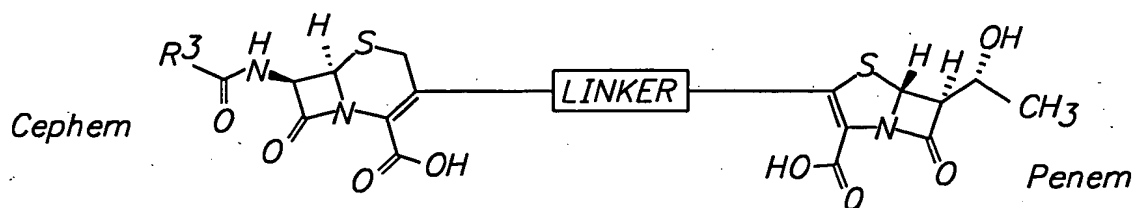
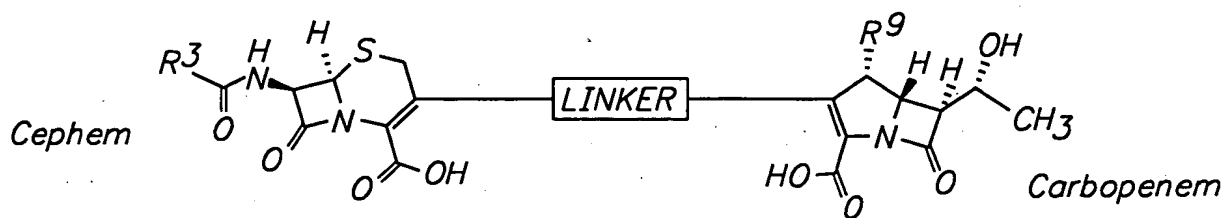


FIG. 7B

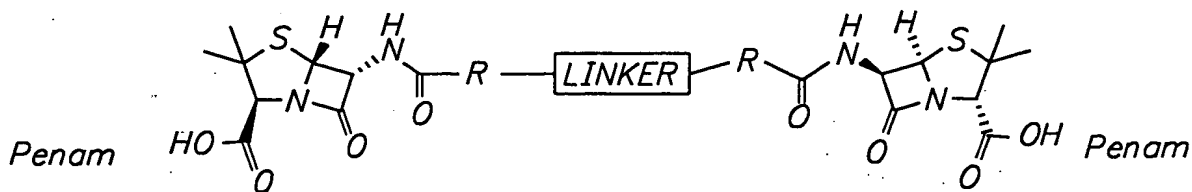
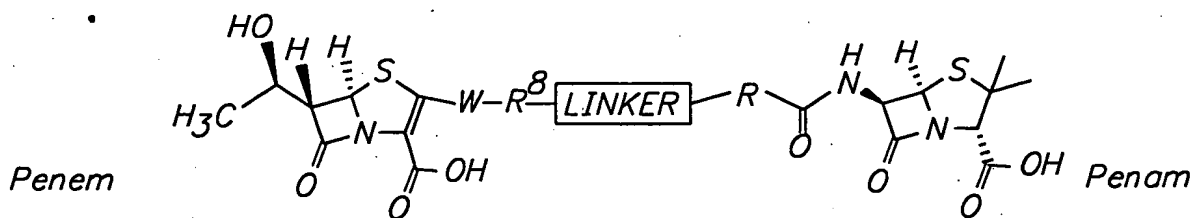
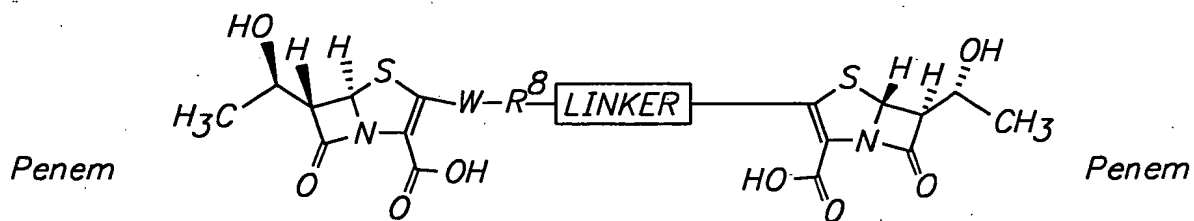
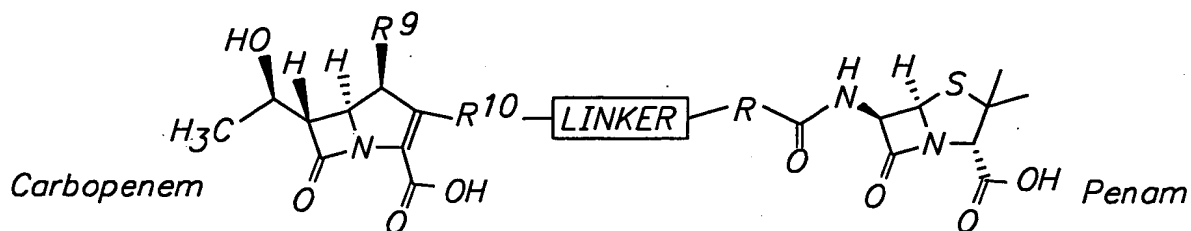
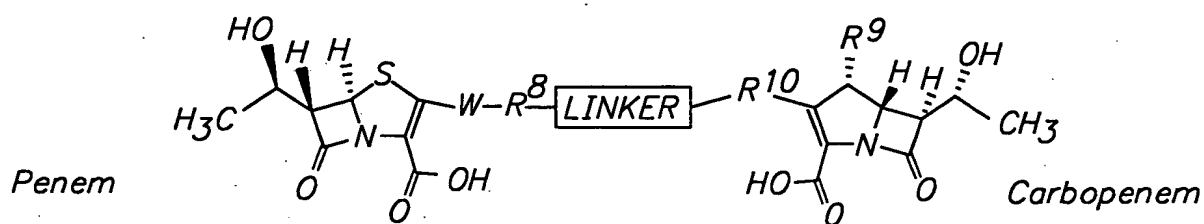
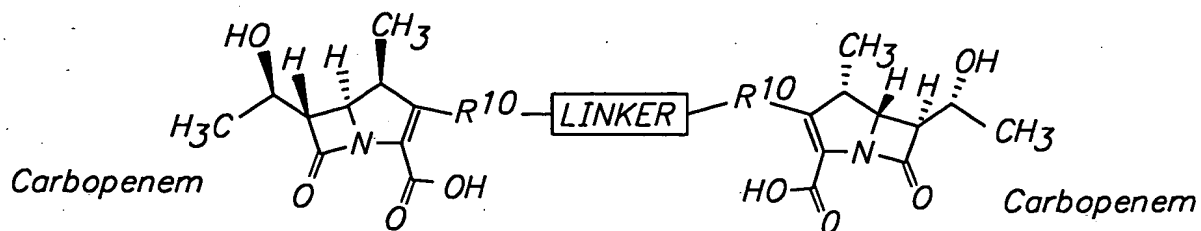


FIG. 8A

Likewise:

Oxacephem-Cephem
Oxacephem-Cepham'
Oxacephem-Penam
Oxacephem-Penem
Oxacephem-Carbopenem
Oxacephem-Carbocephem
Oxacephem-Trinem
Oxacephem-Monobactam
Oxacephem-Monobactam'

Likewise:

Carbacephem-Cephem
Carbacephem-Cepham'
Carbacephem-Penam
Carbacephem-Penem
Carbacephem-Carbopenem
Carbacephem-Carbocephem
Carbacephem-Trinem
Carbacephem-Monobactam
Carbacephem-Monobactam'

Likewise:

Trinem-Cephem
Trinem-Cepham'
Trinem-Penam
Trinem-Penem
Trinem-Carbopenem
Trinem-Carbocephem
Trinem-Trinem
Trinem-Monobactam
Trinem-Monobactam'

Likewise:

Monobactam-Cephem
Monobactam-Cepham'
Monobactam-Penam
Monobactam-Penem
Monobactam-Carbopenem
Monobactam-Monobactam
Monobactam-Monobactam'
Monobactam'-Monobactam'

FIG. 8B

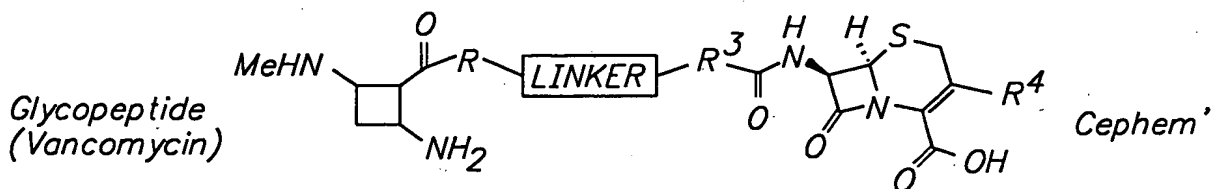
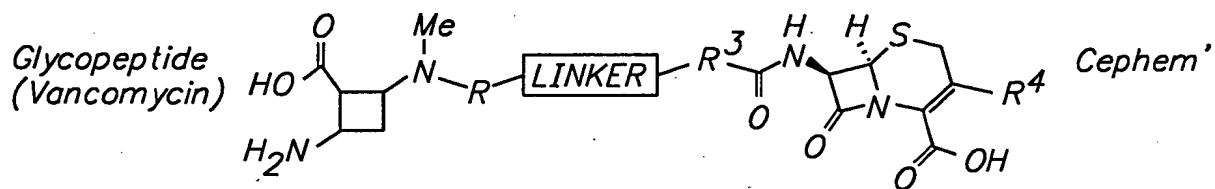
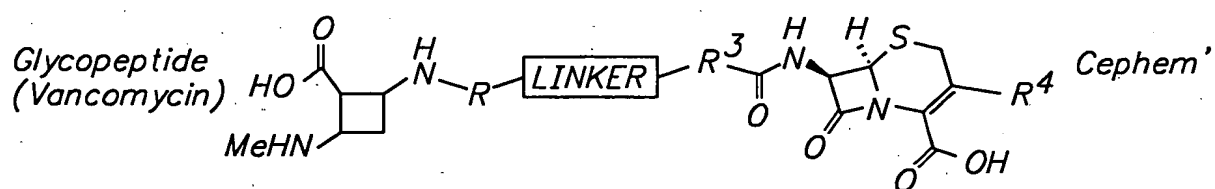
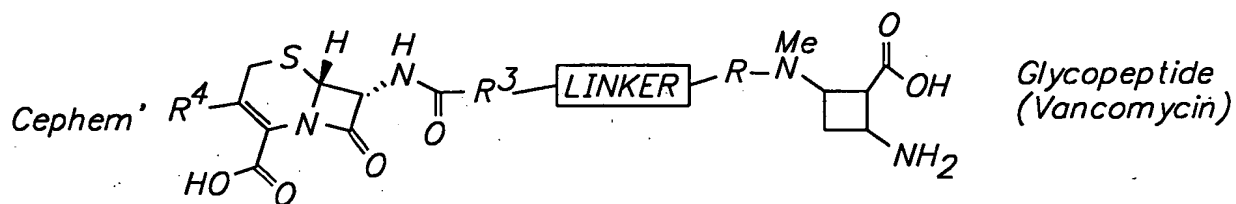
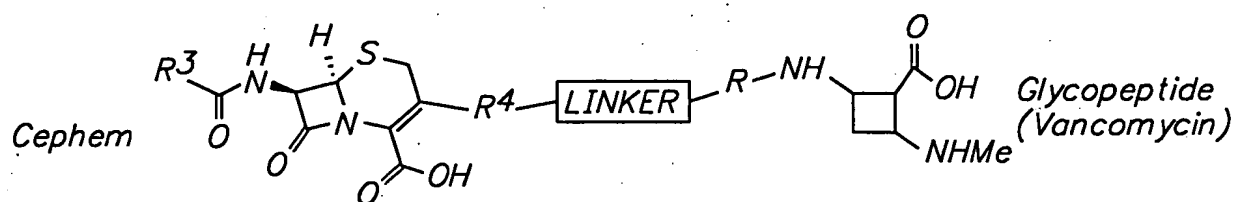
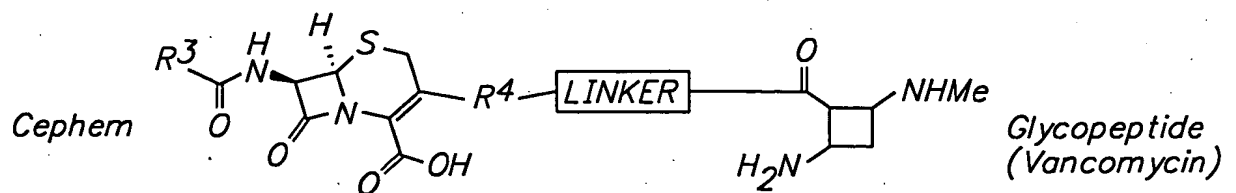
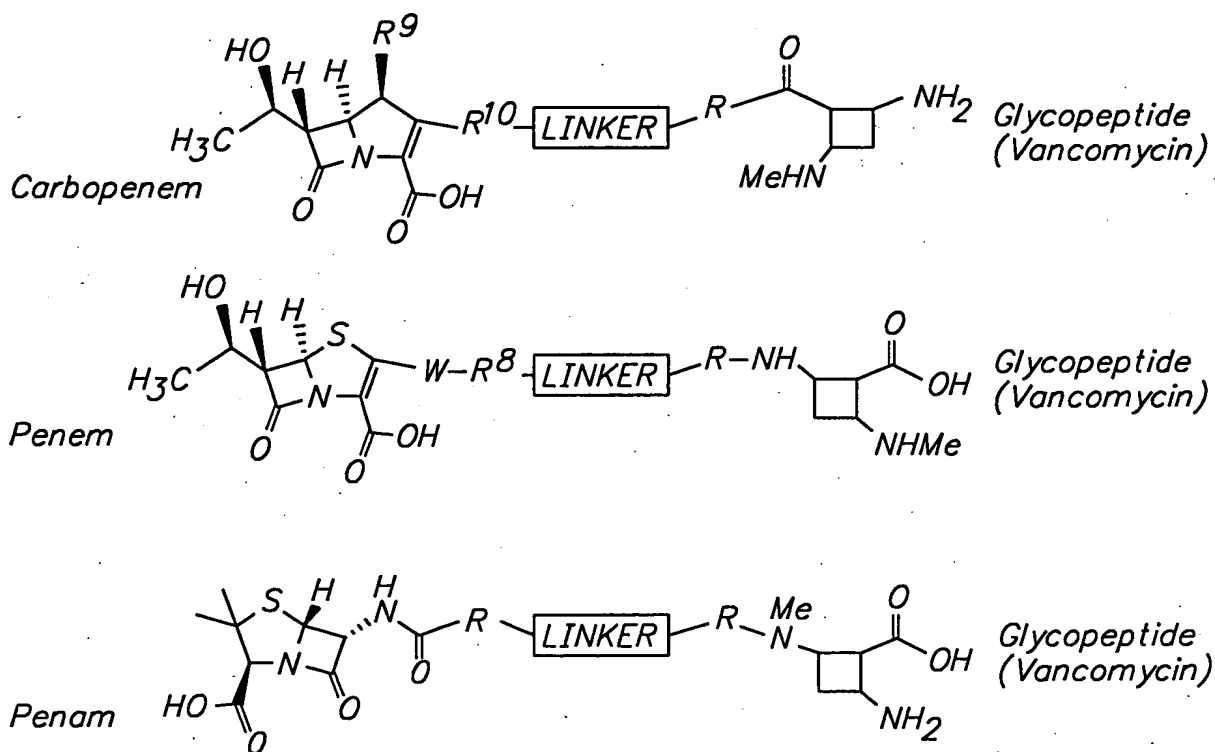


FIG. 9



Likewise Glycopeptide Antibiotic Linked to these
betalactam Antibiotics:

Oxacephem— Glycopeptide Antibiotic
 Trinem— Glycopeptide Antibiotic
 Carbacephem—Glycopeptide Antibiotic
 Monobactam— Glycopeptide Antibiotic
 Monobactam'— Glycopeptide Antibiotic

FIG. 10

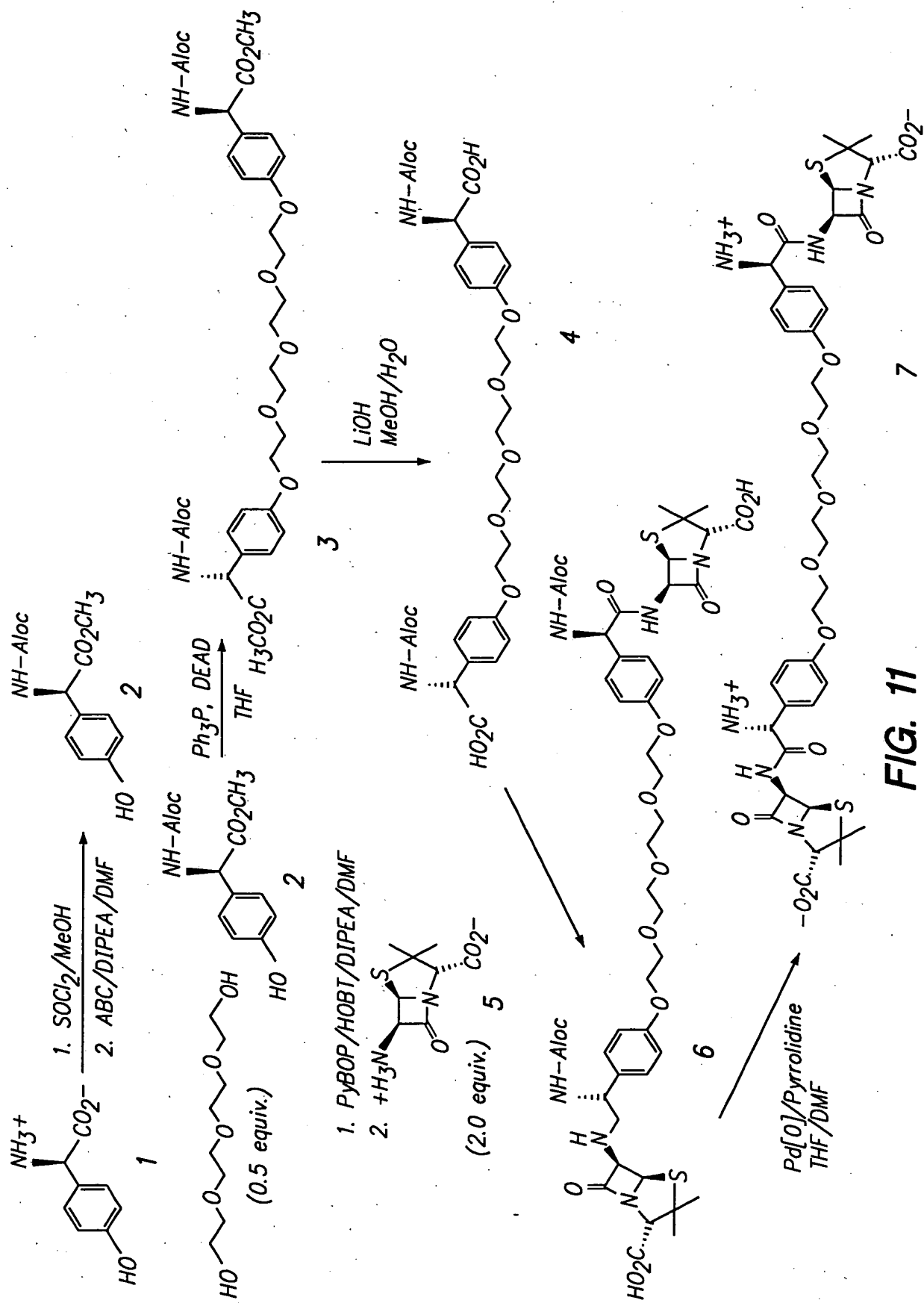


FIG. 11

Chemical structure of compound 8, showing a thiazolidine ring system with a thiol group and a hydroxyl group.

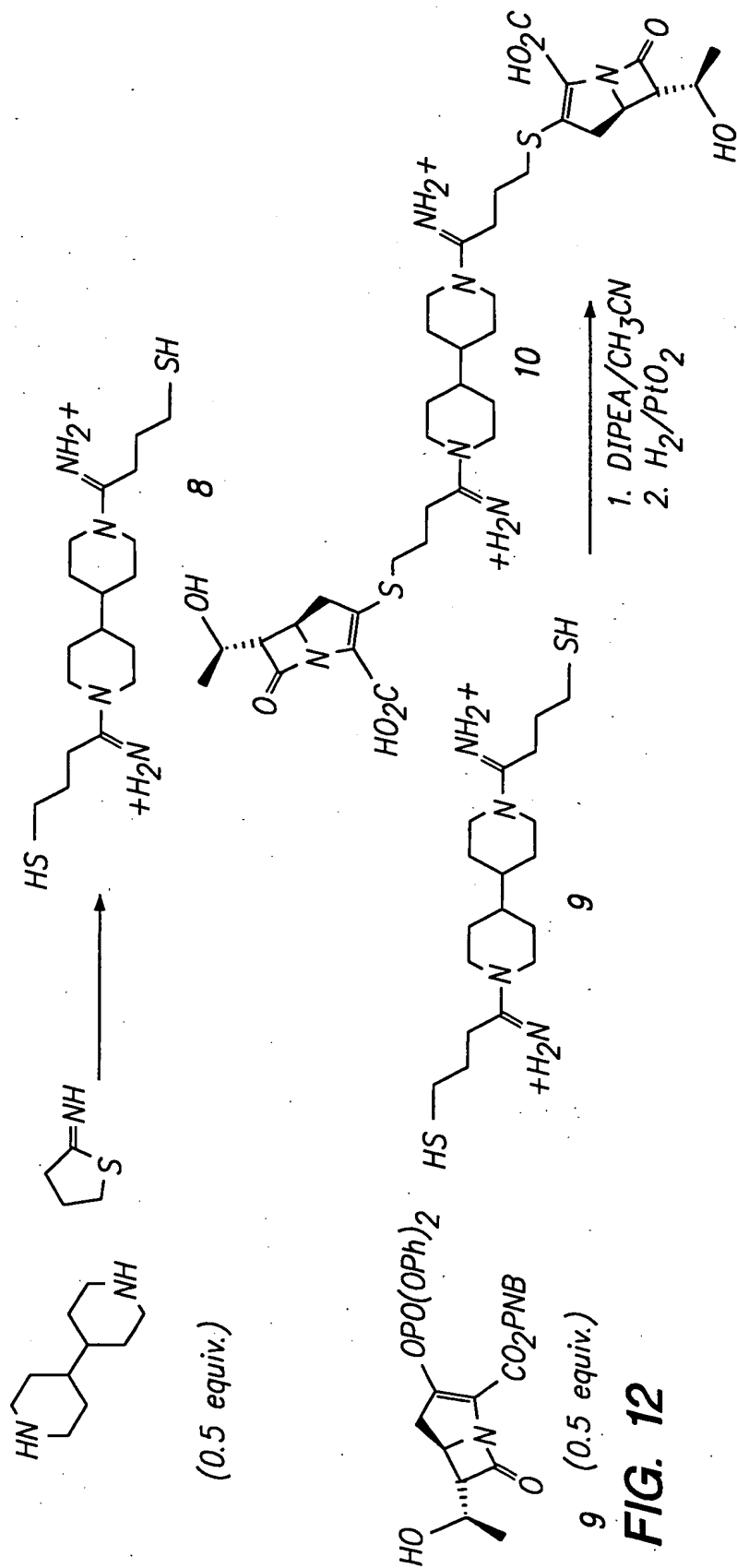


FIG. 12

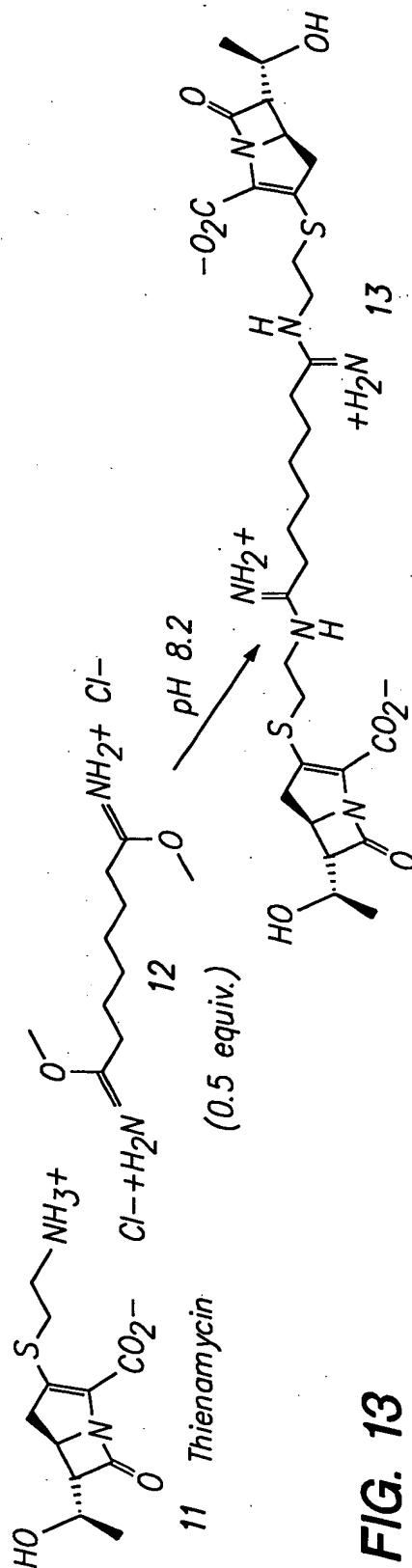


FIG. 13



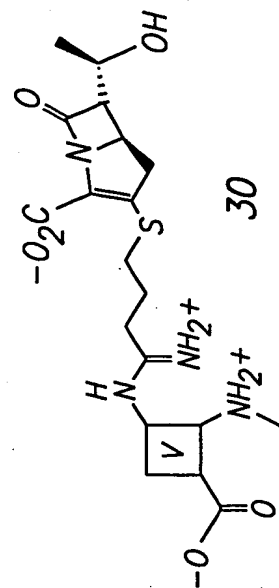
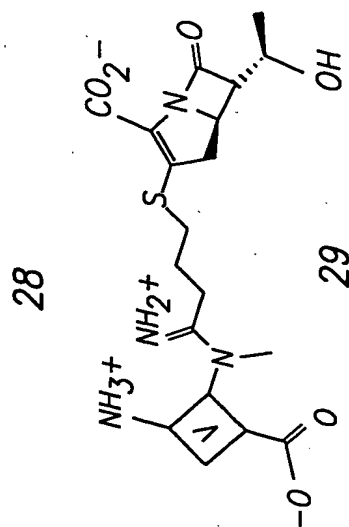
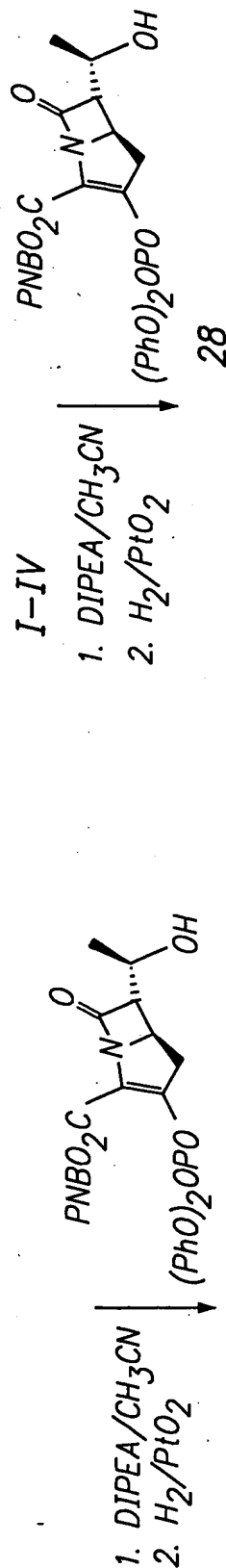
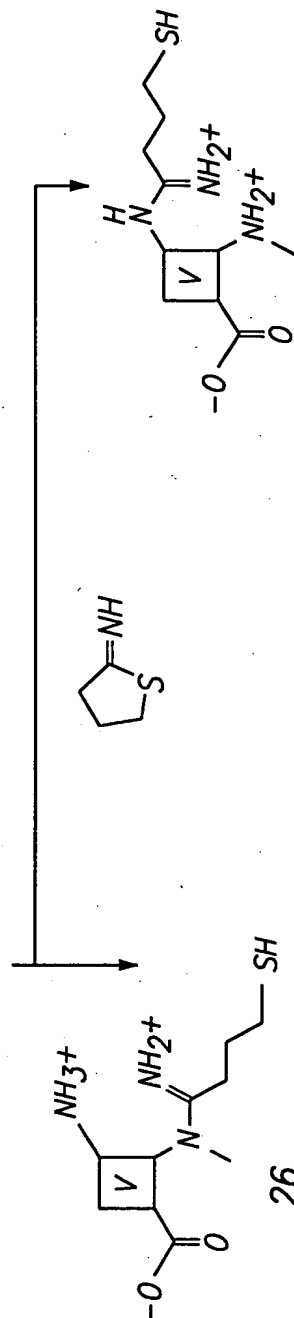
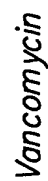
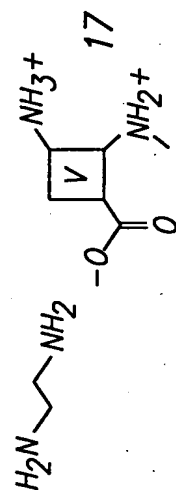


FIG. 15

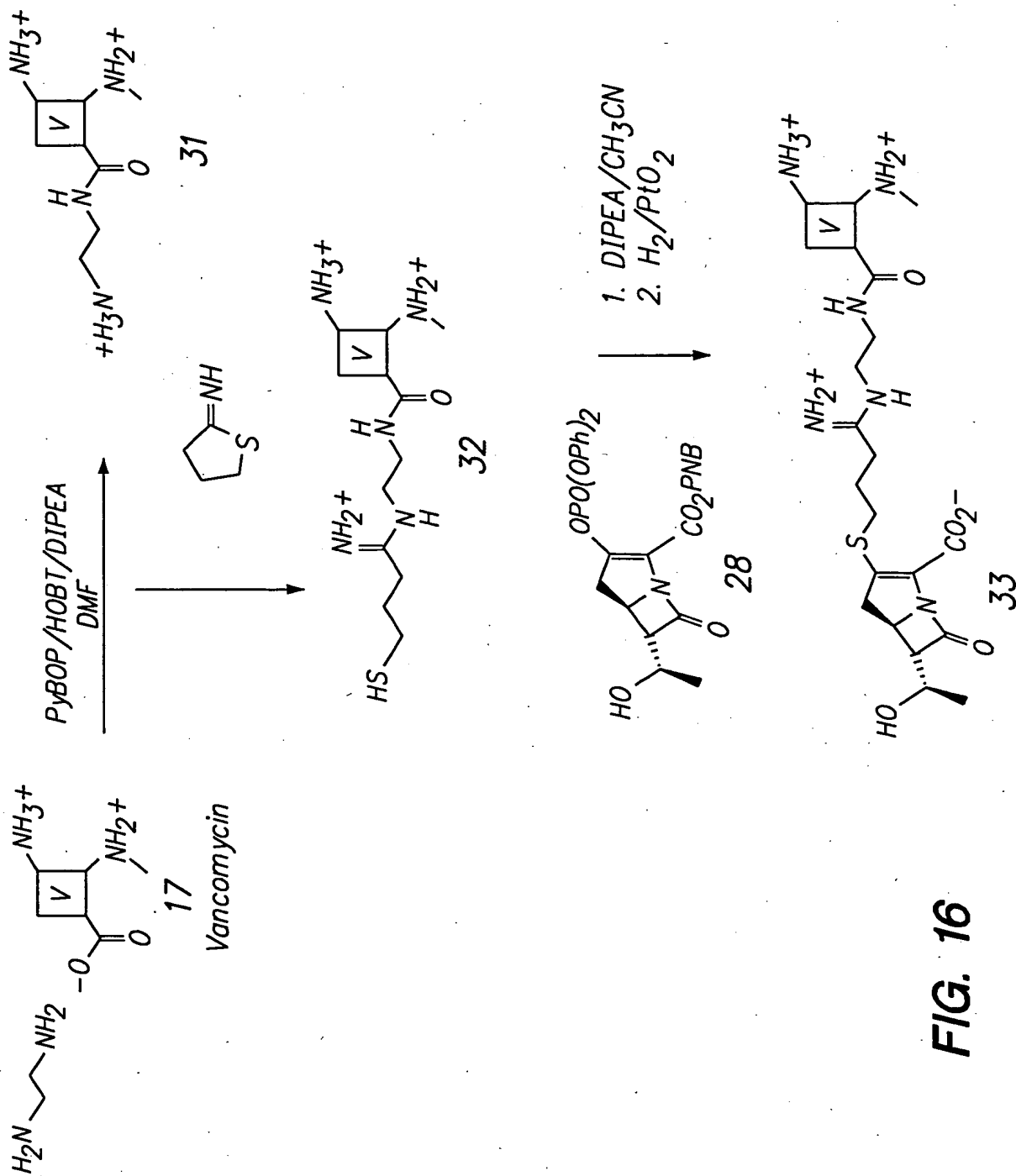
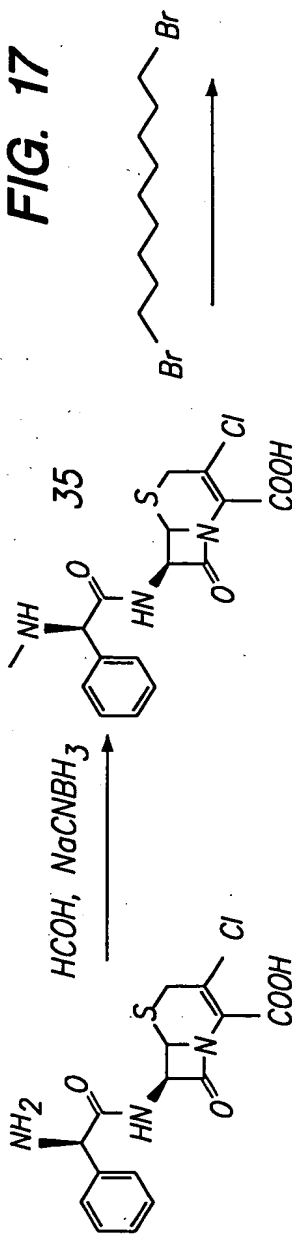


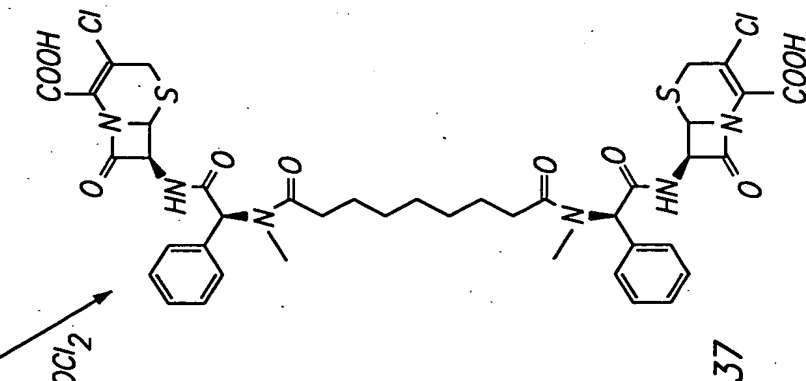
FIG. 16



Cephaclor, commercially available

34

FIG. 18



37

36

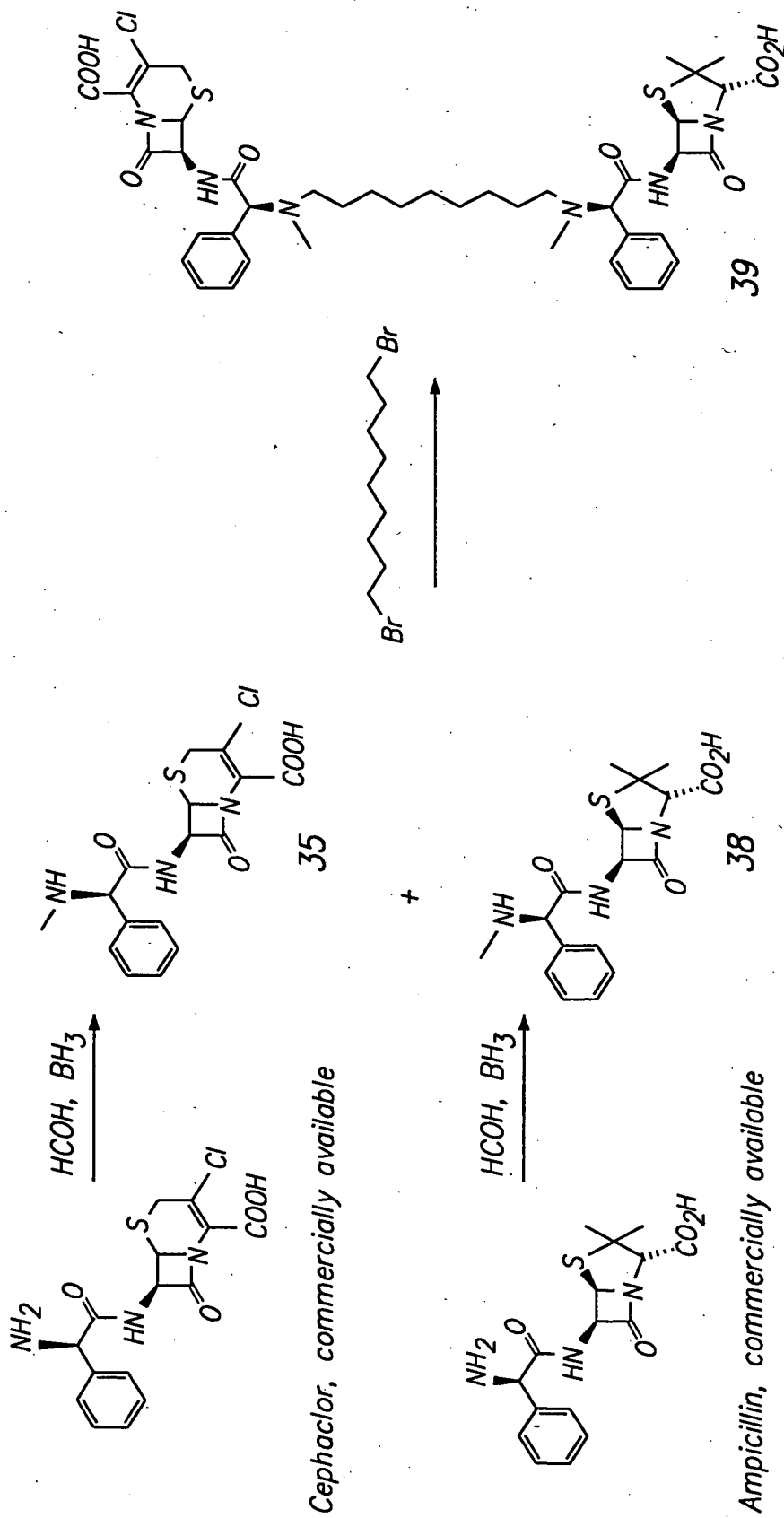


FIG. 19

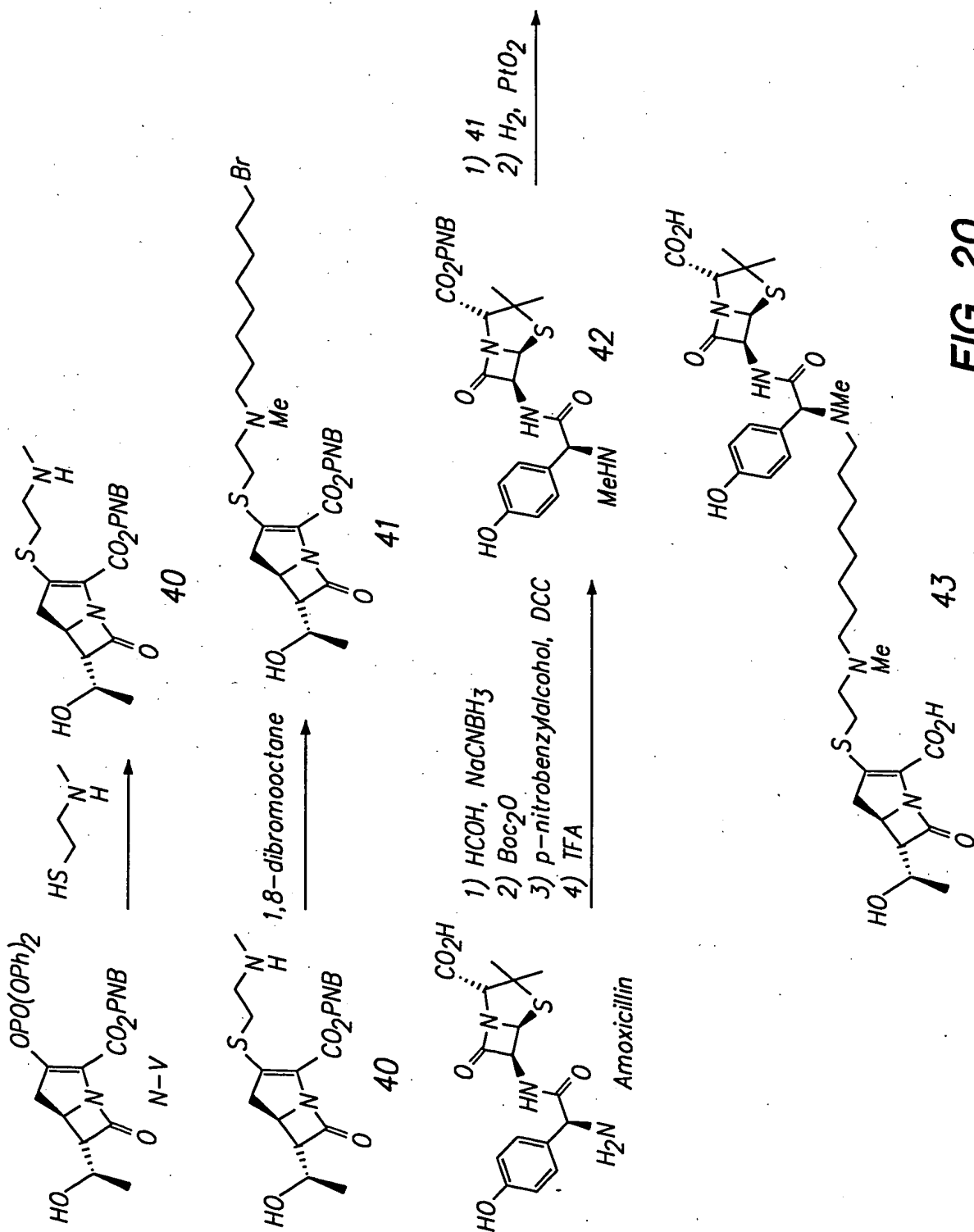


FIG. 20

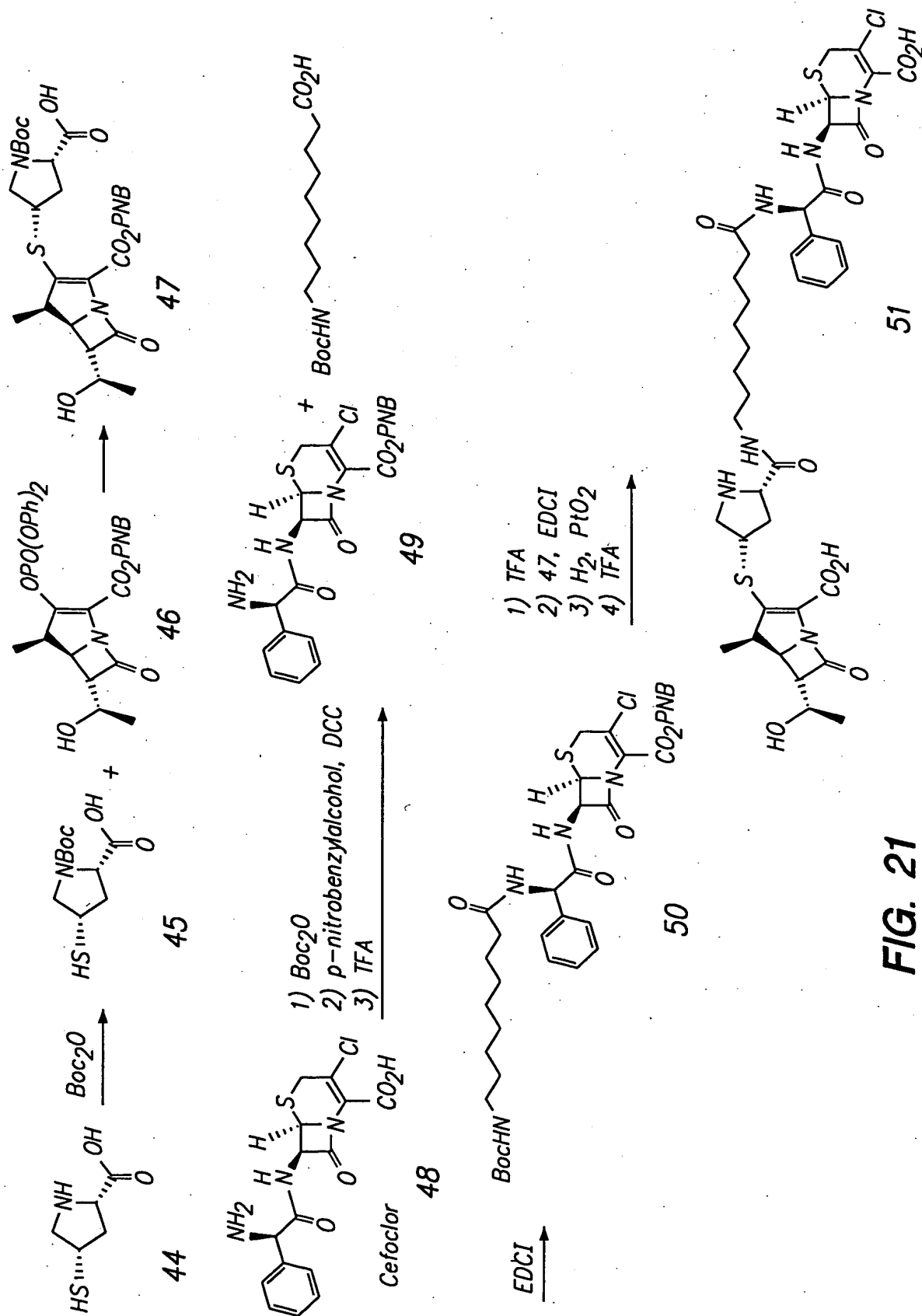


FIG. 21

FIGURE 22

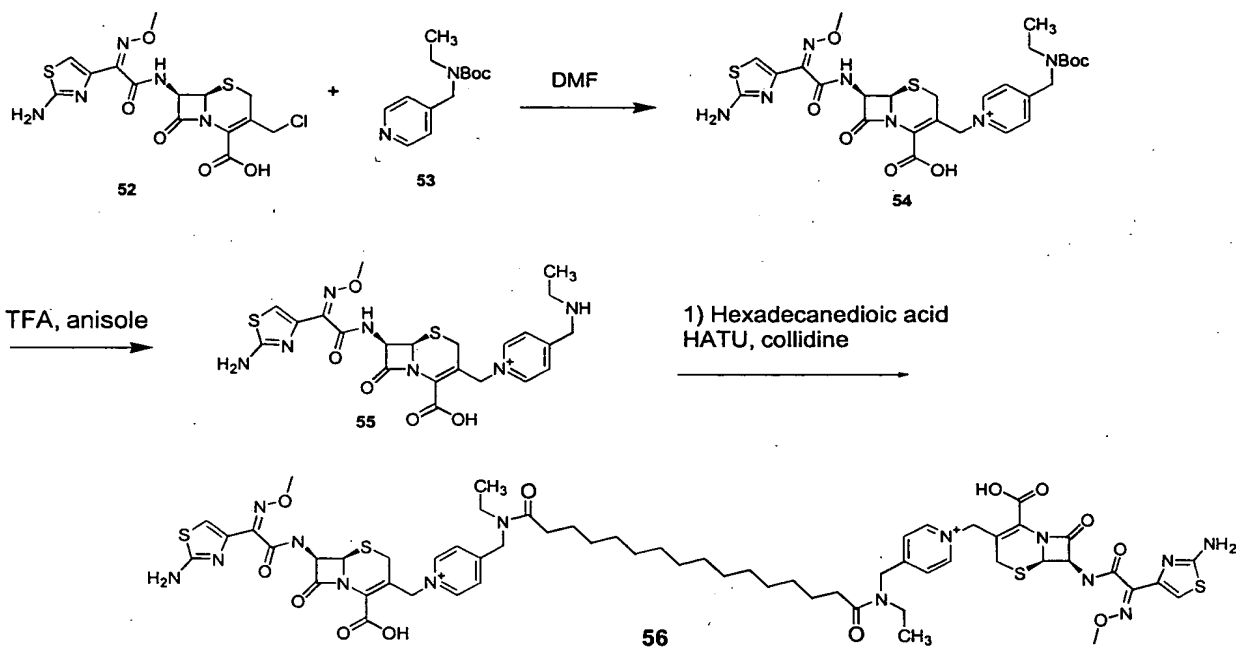


Figure 23

